

REMARKS

Reconsideration and allowance of the subject application in view of the following remarks is respectfully requested.

Claims 1, 2 and 5 are pending in the application. The claims remain unchanged notwithstanding the new ground of rejection.

Specifically, the new 35 U.S.C. 103(a) rejection of claims 1, 2, and 5 as being obvious over *Hata* (U.S. Patent No. 6,649,942) in view of *Hiraoka* (U.S. Patent Application Publication No. 2001/0002139) is traversed, because a prima facie case of obviousness has not been properly established.

To establish a prima facie case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, not in applicant's disclosure. *See MPEP*, section 2143 quoting *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

Applicants respectfully submit that the Examiner's rejection has failed to meet at least the first and third criteria.

With respect to the first criterion, the Examiner's suggestion or motivation is inadequate. In the Final Office Action, at page 3, the Examiner alleged that "*Hiraoka* teaches the AuZnNi alloy forms an ohmic electrode which absorbs less light and the LED efficiency of the external quantum yield is increased." Applicants respectfully disagree, because *Hiraoka* does not teach such.

In particular, *Hiraoka* emphasizes two important aspects of an LED, i.e., in order to improve the light emitting efficiency, it is important that

- (a) internal quantum yield for converting the applied current into the light is maximized by utilizing direct transition to the re-binding process, and
- (b) the emitted light is efficiently taken out to the exterior. *See Hiraoka* at paragraph [0006], lines 4-9.

These aspects appear to be relied upon by the Examiner as a suggestion or motivation to combine *Hiraoka* with *Hata*.

However, *Hiraoka* teaches that the former, i.e., (a), is obtained by changing x in a p-layer of $\text{Al}_{(1-x_1)}\text{Ga}_{x_1}\text{As}$ on the p-substrate to form heterojunction and to make the current applying efficiency (i.e., the re-binding contributing to the light emission) more effective. *See Hiraoka* at paragraph [0007], lines 5-11. Thus, feature (a) is obtained by an appropriate material of the p-layer (FIG. 14B of *Hiraoka*), and is not at all related to the AuZnNi alloy.

The reference also teaches that the latter, i.e., (b), is obtained by selecting x_2 in an n-layer of $\text{Al}_{(1-x_2)}\text{Ga}_{x_2}\text{As}$ to have a transparent layer having less light-absorbing feature with respect to a light taking-out direction, thereby making it possible to take out a larger amount of external light emitting output. *See Hiraoka* at paragraph [0007], lines 7 and 12-15. Thus, feature (b) is obtained by an appropriate material of the n-layer (FIG. 14B of *Hiraoka*), and is not at all related to the AuZnNi alloy.

Accordingly, a person of ordinary skill in the art learning of the teachings in paragraphs [0006]-[0007] of *Hiraoka* would recognize that the advantages relied on by the Examiner as a suggestion or motivation to combine are not at all associated with the material of the alloy layer. Therefore, the person of ordinary skill in the art would not have provided the *Hata* device with the *Hiraoka* alloy layer as proposed by the Examiner, because it is neither disclosed, taught nor suggested in/by the *Hiraoka* disclosure how *Hata* would have benefited from such a

combination/modification.

Therefore, the references are not combinable in the manner suggested by the Examiner.

With respect to the third criterion, assuming *arguendo* that *Hata* and *Hiraoka* can be combined as proposed in the Final Office Action, the combined device would still lack the limitation of independent claim 1 that “an alloy layer formed on the upper clad layer, and made of ZnNi.”

According to the Examiner, *Hiraoka* discloses a p-side electrode that is made of AuZnNi alloy. However, the p-side electrode disclosed by *Hiraoka* is not made of ZnNi alloy, as presently claimed. Rather, the *Hiraoka* p-side electrode is made of Au/Zn-Ni-Au. *See Hiraoka* at paragraph [0007], lines 16-17. A person of ordinary skill in the art would understand that, in the related art, “/” denotes a division of adjacent layers, and “-” indicates ingredients of an alloy. Thus, the p-side electrode of *Hiraoka* comprises two separate layers, i.e., an Au layer and a Zn-Ni-Au layer. The person of ordinary skill in the art would further recognize that since the *Hiraoka* p-side electrode forms an ohmic electrode (*Hiraoka* at paragraph [0007], the last line), the Au layer must contact and, hence, be disposed on the p-type GaAs layer of *Hiraoka*. Therefore, the layer that is formed on the p-type GaAs layer of *Hiraoka* is an Au layer, rather than a ZnNi alloy layer as presently claimed. As a result, the combined device of *Hata* and *Hiraoka*, if proper, would include the same Au layer on the upper claimed layer, and fail to teach or disclose all limitations of independent claim 1.

Of particular note, the ZnNi alloy layer of the claimed invention is applied for preventing Mg (p-type dopant) from combining with hydrogen existing on the surface of the upper clad layer, thereby reducing ohmic resistance. *See*, e.g., the specification at page 10, lines 9-14. However, the p-type GaAs layer of *Hiraoka* contains Zn as dopant, and hydrogen gas is not used in the process of GaAs growth. Therefore, *Hiraoka* does not need/disclose a hydrogen-storing alloy, and the

reference's Zn-Ni-Au alloy cannot function as a hydrogen-storing alloy, unlike the claimed alloy layer.

For any of the reasons advanced above, Applicants respectfully submit that independent claim 1 is patentable over *Hata* and *Hiraoka*, and request that the obviousness rejection of claim 1 be withdrawn.

Claims 2 and 5 depend from claim 1, and are considered patentable at least for the reasons advanced with respect to claim 1.

Accordingly, all claims in the present application are now in condition for allowance. Early and favorable indication of allowance is courteously solicited.

The Examiner is invited to telephone the undersigned, Applicant's attorney of record, to facilitate advancement of the present application.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 07-1337 and please credit any excess fees to such deposit account.

Respectfully submitted,
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